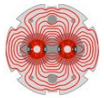


BNL -FNAL - LBNL - SLAC

Commissioning: Beam, IR and Hardware

Mike Syphers

Introduction/History
IR/Hardware Commissioning Status
Tasks & Budget
Time Line ***
Summary/Conclusions

Evolution of LARP Commissioning

- Initial Concept (Strait, Marriner, *et al*.):
  - Support continuation of U.S. program, to deliver/commission IR magnets and components
  - Work toward having “one LARP person on each commissioning shift”
  - Implies equilibrium of ~ 5-7 people at CERN from US

- Began discussions with CERN in 04 -- LHC/OPS generated lists of tasks
  - began filling in CERN responsible parties; space left for LARP names to be added
  - Napa Meeting 04 was a ‘turning point’ -- lists presented, discussed
  - learned of emerging ‘crisis’ of Hardware Commissioning personnel

Evolution of LARP Commissioning

- R. Saban, *et al*., generated report, detailing personnel needs for Hardware Commissioning
  - ~43 'missing' staff
    - requested positions include cryo, power supply engineers, etc.
    - Seeking help across Europe, world -- LARP can play a role
  - LARP awaited official 'request' from CERN
    - Received ~ Jun 05; response soon followed from DOE
- Commissioning Task Force assembled (V. Shiltsev)
  - Final Report produced in August 2005
    - Use LARP as mechanism for HComm efforts
    - Get involved w/ HComm, ASAP
    - Involve jr. Staff in Comm -- Toohig Fellows
    - Better integrate all Comm activities w/in LARP

CERN
CH-1211 Geneva 23
Switzerland

the Large Hadron Collider project

LHC Project Document No.
LHC-PM-MR-0002 rev 1.0
CERN Div./Group or Supplier/Contractor Document No.
AB-CO/AB-OP/AB-PO/AT-ACR/AT-MEL/TS-HDO
EDMS Document No.
503580

Date: 2004-11-15

Management Report

RESOURCES FOR HARDWARE COMMISSIONING

PART 1: THE COMMISSIONING OF THE SUPERCONDUCTING MAGNET CIRCUITS AND THE ASSOCIATED TECHNICAL SYSTEMS

Abstract

It is expected that the hardware commissioning will be dominated by the commissioning of the very complex powering system for superconducting magnets and its associated infrastructure. Time and investment for additional personnel will be mainly spent for this activity.
This document presents **the resources identified for a commissioning scenario restricted by a number of assumptions**: in particular, the parallel commissioning of two sectors around an even point -**not more and not less**- and the staggered commissioning of an additional set of two sectors where the cool down follows the powering tests of the first set (see page 4).
However from the data presented in this document, it is possible to derive the resources needed for a different scenario when some of the restrictions are lifted or relaxed.

Prepared by :	*Checked by :*	*Approved by :*
Simon Baird Frederick Bordry Bertrand Frammery Karl-Hubert Meß Roberto Saban Laurent Tavian Juan Casas-Cubillos Paulo Gomes Félix Rodríguez-Mateos Bruno Puccio Robin Lauckner Rüdiger Schmidt Luigi Serio Markus Zerlauth	Paolo Ciriani Philippe Lebrun Steve Myers Paul Proudlock	Lyn Evans

Evolution of LARP Commissioning

- Reorganization: APC --> '**AP**' and '**C**'
  - Separating Accelerator Physics from Commissioning allowed for better concentration on these separate issues
- Present Commissioning tasks include
  - IR Commissioning (USLHC deliverables)
  - Hardware Commissioning (i.e., non-USLHC items; *prev. slide*)
  - Beam Commissioning
- IR and HW Commissioning employ many of same people, similar expertise; much overlap
  - Mike Lamm leads both IR and HW aspects
  - Elvin Harms leading Beam Commissioning; assists Lamm in Fermilab HW Comm (covers both AccDiv and TechDiv)
  - ***Commissioning Oversight Team*** (COT) identified to help coordinate and facilitate long-term visits to CERN for HW and Beam Commissioning:
    - *M Syphers*, FNAL; *J Kerby*, FNAL; *M Zisman*, LBNL; *W Fischer*, BNL
- FNAL Director agrees to support add'l 4-7 people for HW Comm; LBNL agrees to add'l 2-3; BNL will be 'case-by-case'; SLAC=0.

Interfacing to LHC Controls

- US participation in commissioning the LHC will require knowledge and understanding of the LHC Controls System
  - Delivering an 'instrument' will require being able to interface it to the Controls System, perform diagnostics, etc.
  - Assisting in Commissioning (IR/HW/Beam!) will require ability to access accelerator data, perform analyses both locally (CCC) and from afar (in a CERN office; US office?)
- Commissioning tasks should include efforts to familiarize LARP personnel with LHC Controls
  - Need efficient mechanism for getting physicists started
- Fermilab is expected to have 'remote access' center (LHC@FNAL)
  - While not a LARP activity, *per se*, such a center will be very useful to all LARP participants
- At some small level, need to include this interfacing within the Commissioning task

IR Commissioning (USLHC) -- Status

M. Lamm

- Above Ground Mechanical Fitup
- Installation Oversight and
- Hardware Commissioning of US Deliverables

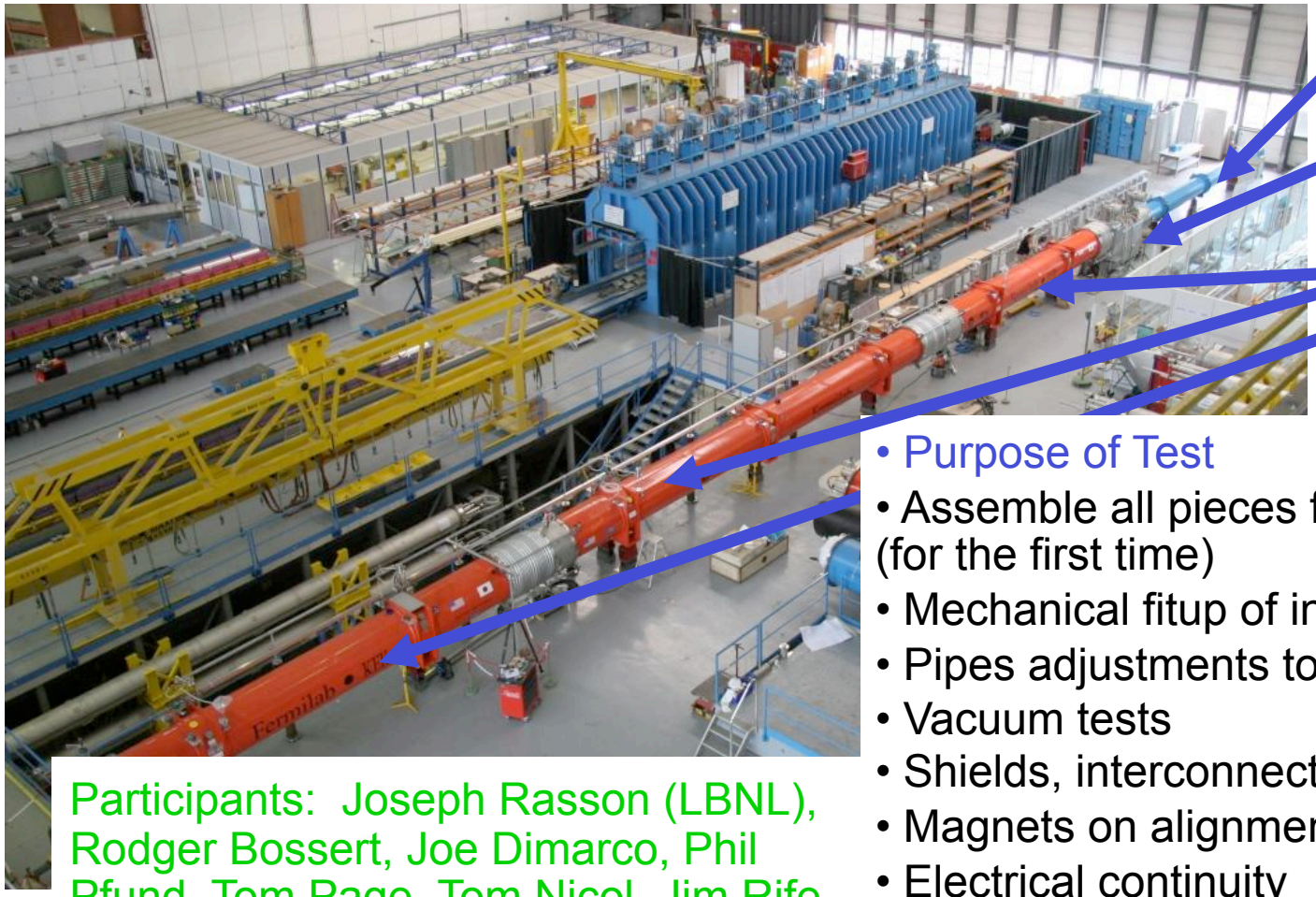
*Really Installation and commissioning

Goal is to get our US deliverables from US-LHC construction project up and running as soon as possible

LARP Commissioning

- IR Commissioning
- Hardware Commissioning
- Beam Commissioning

Successful Above-Ground Fit-up of US Deliverables LHC Assembly Building March-April 2005

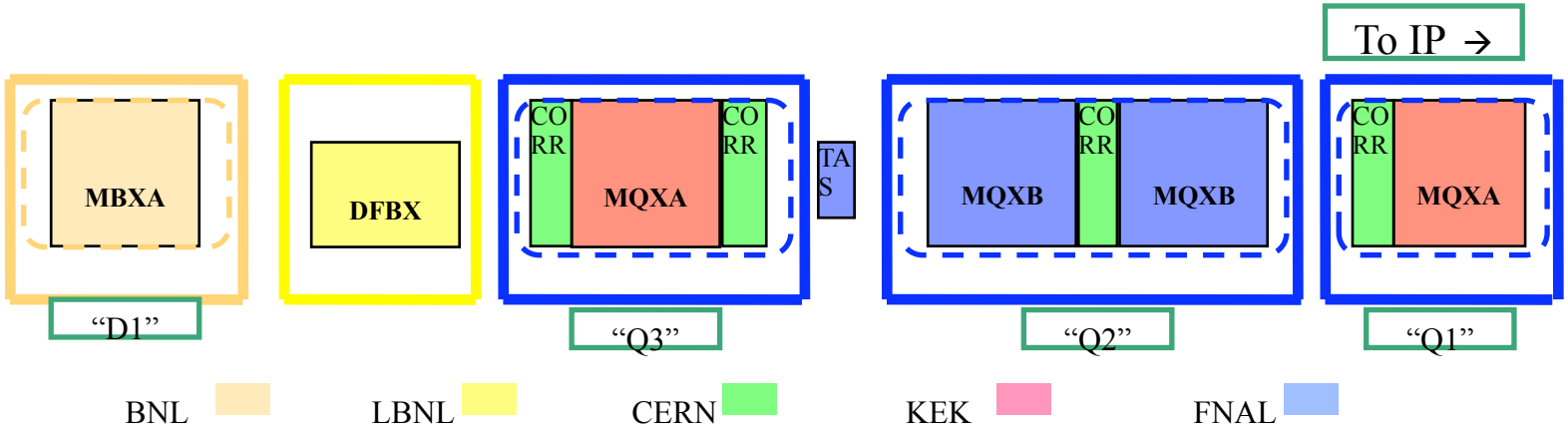


- D1 (BNL)
- DFBX (LBNL)
- Inner Triplet (FNAL with KEK)

- Purpose of Test
- Assemble all pieces for one complete IR (for the first time)
- Mechanical fitup of interconnects
- Pipes adjustments to install length, dry fit
- Vacuum tests
- Shields, interconnect kits
- Magnets on alignment jacks
- Electrical continuity

Participants: Joseph Rasson (LBNL), Rodger Bossert, Joe Dimarco, Phil Pfund, Tom Page, Tom Nicol, Jim Rife, Michael Lamm (FNAL)

Components to be Commissioned in 5 IR's



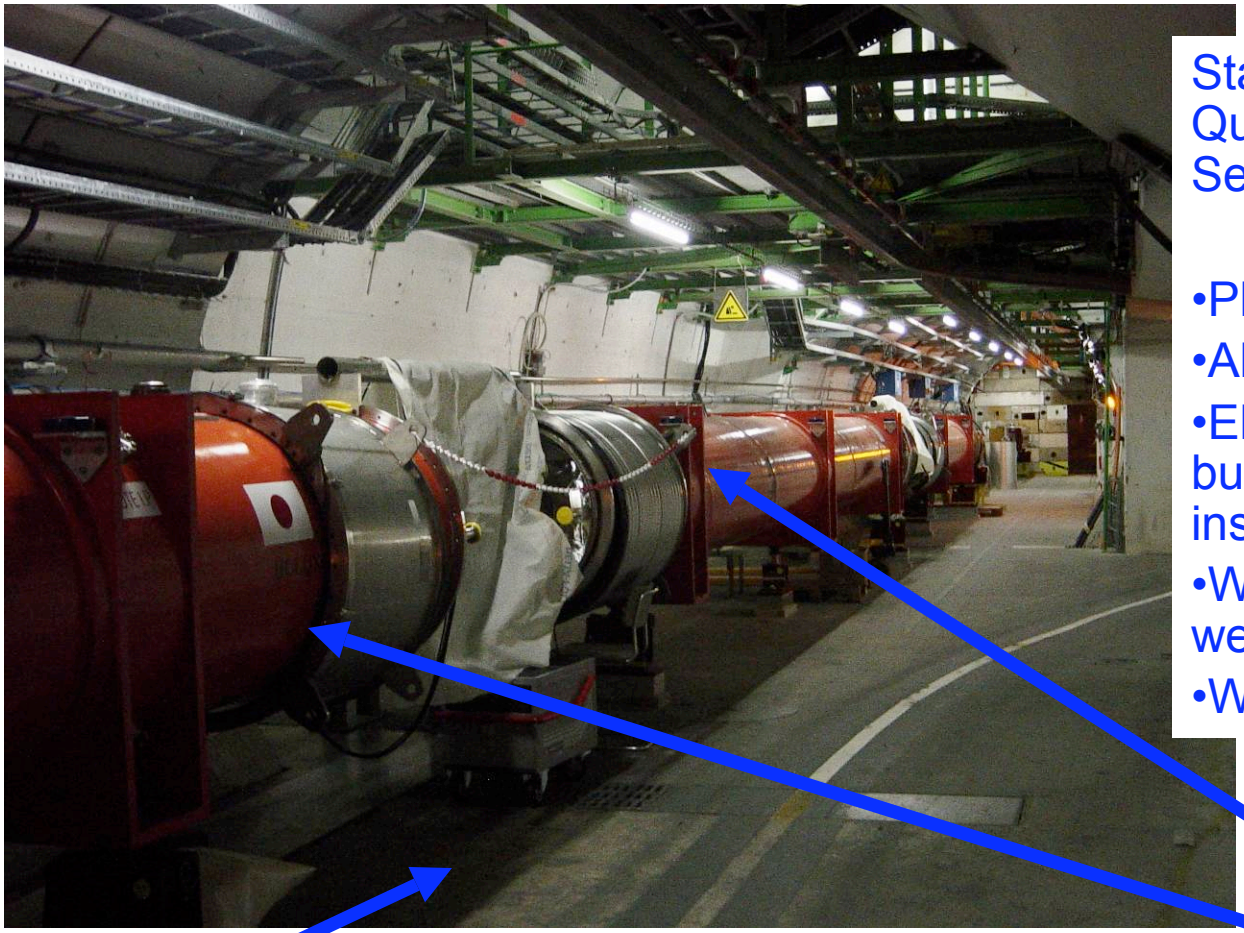
Status of US Shipments to CERN 4/6/2006

IR Region	CERN Start on Equipment Preparations	Q1	Status	Q2	Status	Q3	Status	DFBX	Status	D1	Status	D2	Status
IR8L	Aug-05	A01	at CERN	B04	at CERN	C03	at CERN	G	at CERN	D1L102	at CERN	D2L102	at CERN
IR8R	Aug-05	A04	at CERN	B05	at CERN	C04	at CERN	H	at CERN	D1L105	at CERN	D2L101	at CERN
IR1L	Nov-05	A02	at CERN	B03	at CERN	C05	at CERN	A	at CERN	none		D2L106	at CERN
IR5L	Dec-05	A06	at CERN	B08	at CERN	C06	at CERN	E	at CERN	none		D2L105	at CERN
IR5R	Apr-06	A05	at CERN	B09	at CERN	C07	at CERN	F	at CERN	none		D2L104	at CERN
IR2L	Jul-06	A07	at CERN	B06	at CERN	C08	14-Apr-06	C	at CERN	D1L103	at CERN	D2L107	at CERN
IR1R	Aug-06	A08	at CERN	B10	done	C09	15-May-06	B	at CERN	none		D2L109	at CERN
IR2R	Sep-06	A09	28-Apr-06	B07	30-Jun-06	C02	at CERN	D	at CERN	D1L104	at CERN	D2L108	at CERN
Spare		A03	at CERN	B01	at CERN	C01	at CERN	none		D1L101	at CERN	D2L103	at CERN

IR 4	D3	Status	D4	Status
IR4L	D3L101	at CERN	D4L101	at CERN
IR4R	D3L102	at CERN	D4L102	at CERN
Spare	D3L103	done	D4L103	at CERN

TAS and TAN absorber at CERN ready for installation

Installation of First IR Quads at IP-8 L



Status of Installation of Quads, Feedbox and D1 Separation Dipole:

- Place on Jack stands
- Alignment
- Electrical interconnect of buswork and instrumentation
- Welders qualified for welds
- Welding underway

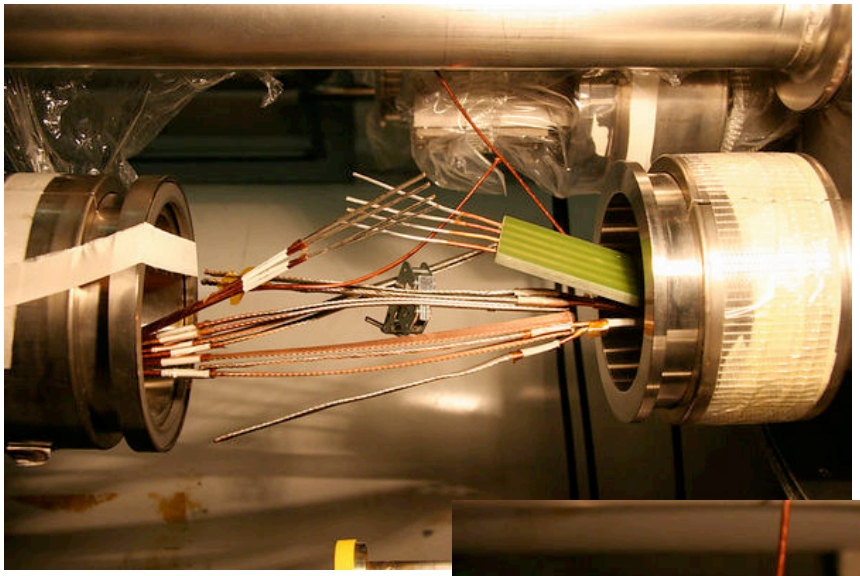
Installation Oversight

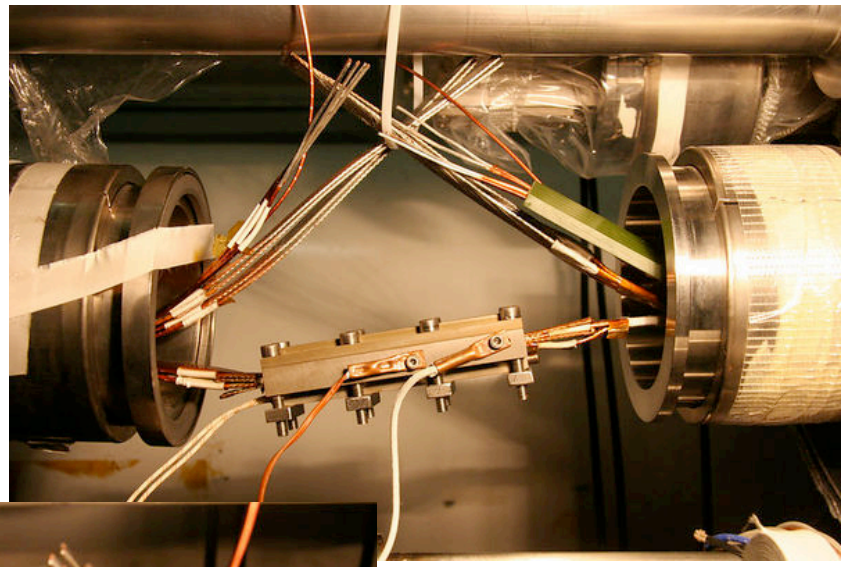
Since DOE Review Last Fall:

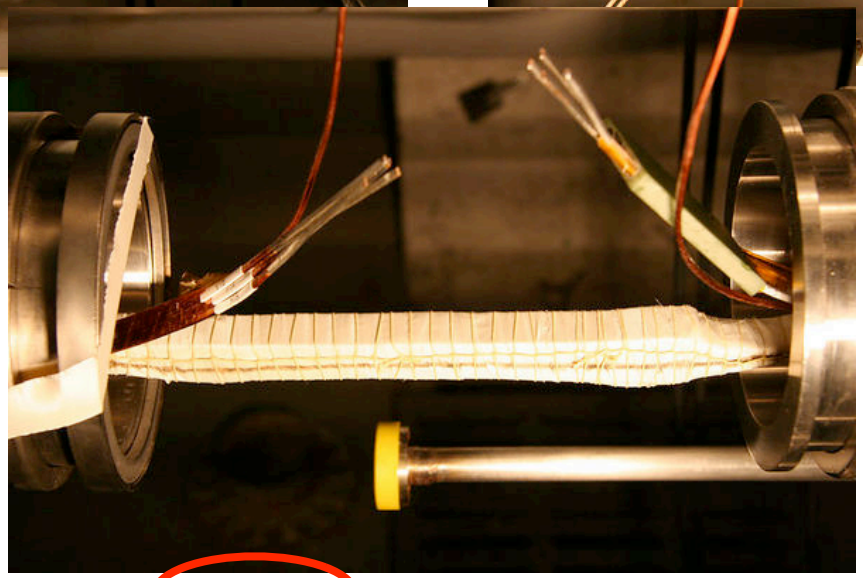
- First USLHC String (Q1-Q3/Feedbox/D1) transported to tunnel in November/December
- LARP Oversight and technology transfer for USLHC interconnects 7 LARP personnel from three institutions during January/Feb 2006
- Weekly meetings to iron out installation issues

Photos from Jan 2006 IR 8L installation

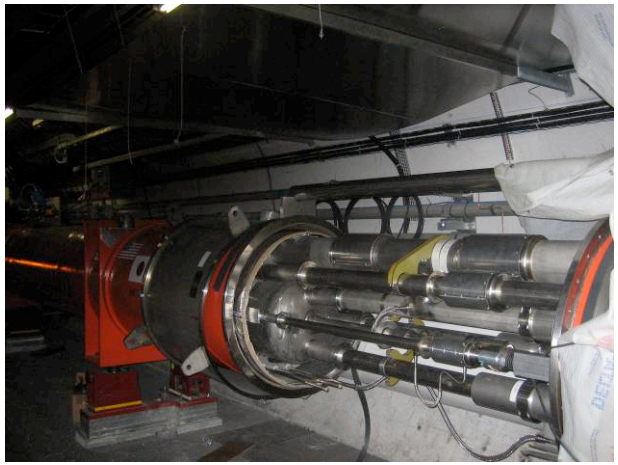
Main Bus Splicing Q1-Q2

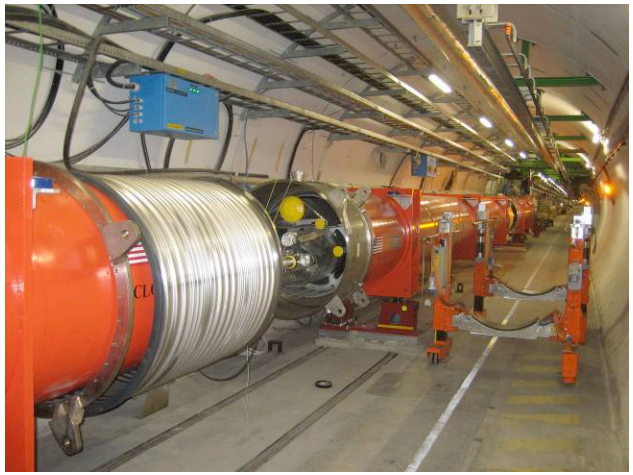


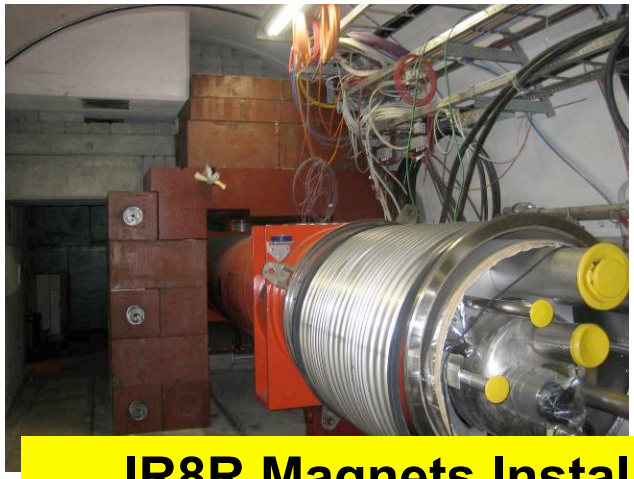




Recent Pictures (taken by Peter Limon)







IR8L interconnects almost complete

IR8R Magnets Installed

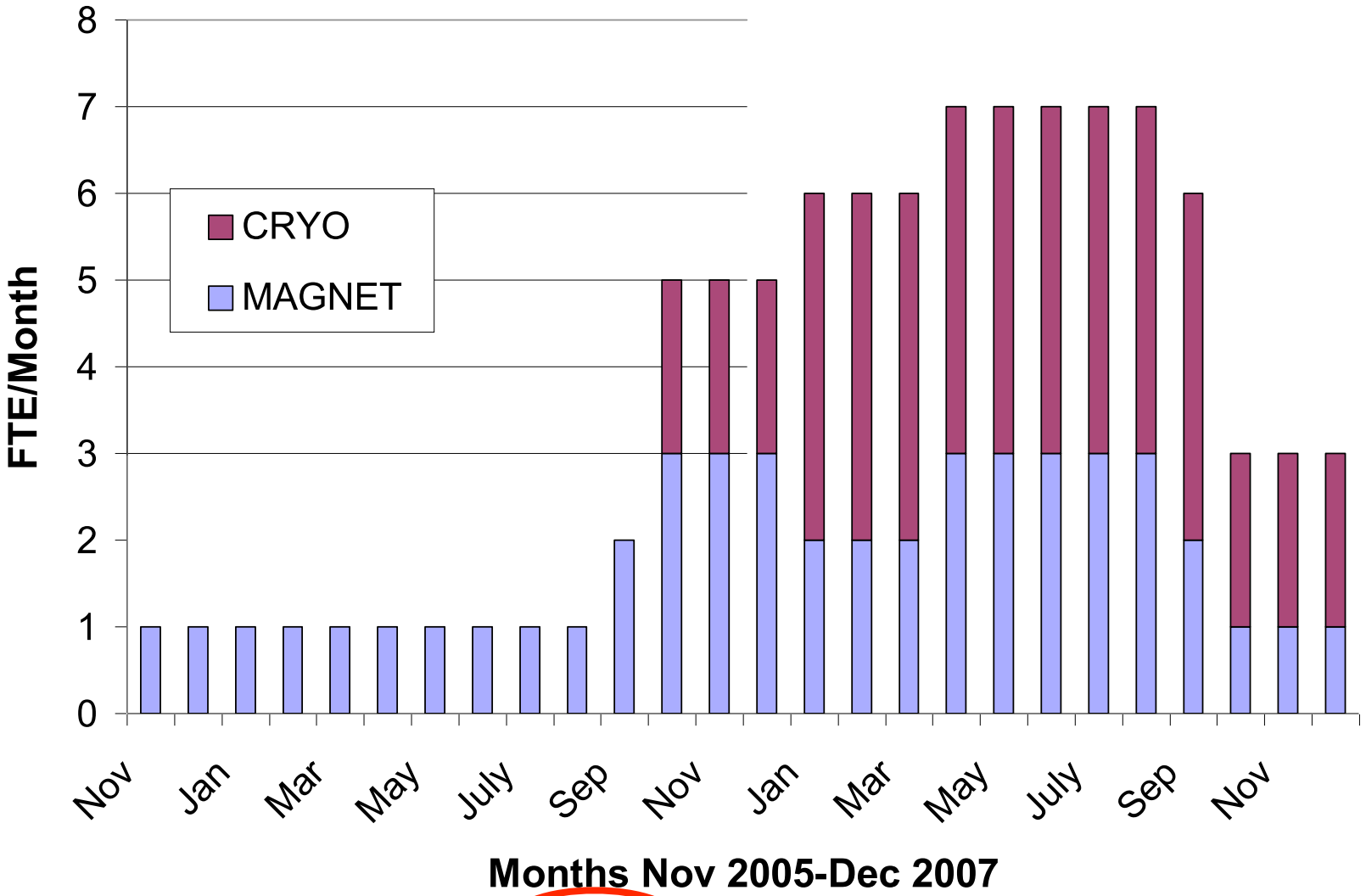
IR Commissioning vs. Hardware Commissioning

- **"General" Commissioning**
- CERN report on deficiency in personnel for HC task
  - Request assistance from outside. Needs: Quench protection, magnet powering, cryogenic operation and cryogenic controls
- Commissioning Task on US participation in Beam and Hardware commissioning Feb-July 2005
  - Conclusion on HC
    - Fermilab could contribute ~6 people from Accelerator and Technical Divisions
    - LBNL could contribute 1-2 people to work cryogenics and DFBX commissioning
- CERN to offer "project associate status" to long term commissioners

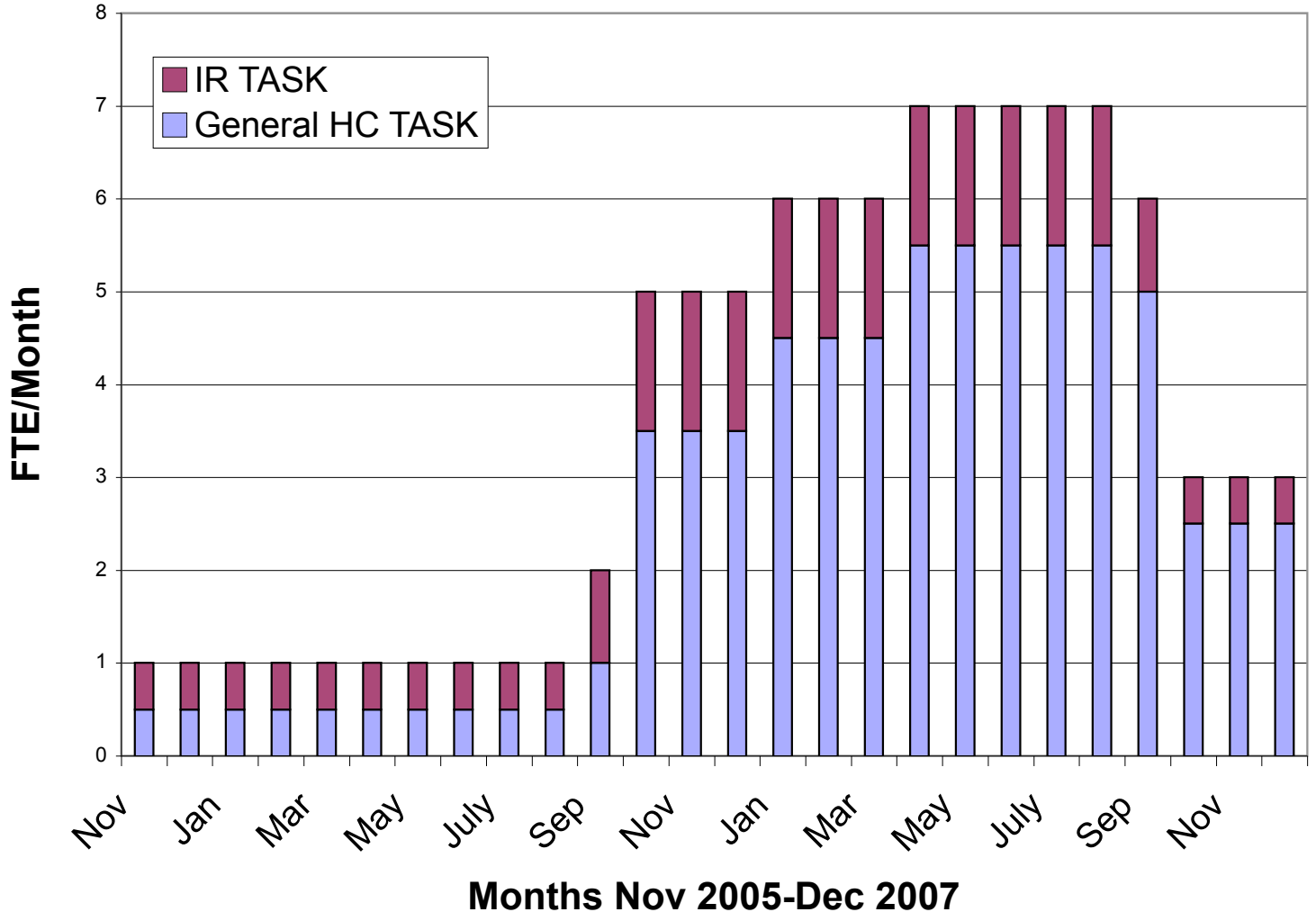
"General" Hardware Commissioning II

- LARP Level 2 Commissioning
  - Identify People
    - Matched to CERN needs
    - Interest in going
    - Lab can spare them (lab won't fall apart without them)
  - Produce list of 6 Fermilab employees.. Including those on IR commissioning
  - LBNL has identified engineer for task with oversight from senior engineer Joseph Rasson

Profile by CERN task



Profile by LARP HC Task



Status of Hardware Commissioners

- 3-4 Hardware Commissioners scheduled for Fall 2006. LARP commissioners receive “Project Associate” status, join a CERN group (AT/ACR or AT/MEL) for nominally one year and contribute to the groups general HC responsibilities as well as US deliverables.
- Short term HC support from US experts as needed
- Peter Limon is stationed at CERN now
  - •Liaison with LARP, LARP Safety Officer
  - •Installation oversight
  - •Assisting in Vacuum issues for Special Short Straight Sections (SSSS)

IR/HW Commissioning -- How We Participate

- Short- vs. Long-term commissioners
  - Some participation through short visits and possibly through remote monitoring (LHC@FNAL)
  - Long Term Commissioners become integrated into existing CERN groups:
    - Early commissioners -- 50% to IR Comm, 50% to HW Comm
    - Peter Limon started his 1 year stay in November 2005
    - Sandor Feher, Roger Rabehl will start in fall of 2006
    - Will ramp up to 6-7 commissioners by early 2007
- Small carryover into beam commissioning to study dynamic heat loads on magnets and cryosystem
  - Important tool for design of IR upgrades
    - Validate energy deposition model
    - Laboratory for radiation damage

Comments on Hardware and Beam Commissioning...

- Looked at areas where US labs can participate in Hardware Comm
  - Produced list of possible candidates, compared w/ CERN's lists
  - People identified; several 'signed up'; FNAL + ~LBNL
  - Peter Limon at CERN now; at least two others from FNAL for long-term stays starting this year; others in the pipe-line; meets goals.
- Beam Commissioning has many interested parties
  - farther in future, so not much effort yet to firm-up these names
    - however, not *so* far away, either!
  - Toohig Fellows to play role here
- Commissioning organization has been slow, but enthusiasm is high
  - Negotiation process is often delicate; list of names is kept, but not easily shared with others
  - Note: LARP 'part-time job' for most (~10% or less)
    - remote participation may involve many more people

Roger Bailey's Lists...

Accelerator Systems and Responsibilities 1

	System
Systems needed pre beam	Control system
	Applications software
	Accelerator technical services
	Vacuum
	Cryogenics
	Access
	Cold magnets
	Warm magnets
	Magnet circuits and powe
	Power Interlock System (
	Quench Protection and En

This is

Accelerator Systems and Responsibilities 2

	System	
Systems needed for beam	SPS extraction, transfer, injection and fi	
	Multi turn losses and BIS dependability	
	Protection devices other than collimato	
	Collimation system and Halo cleaning	
	Clean Beam Extraction	
	Radio protection	
	Beam Instrumentation	Screens
		BCTs
		BPM, trajecto
		BLM
		PLL for Q, Q',
		Profile monito
		Schottky
		Luminosity mo
	Vacuum conditions during operation and	
	Reference magnet system	
	RF systems and longitudinal beam dyna	
	Transverse feedback	
	Experimental solenoids and compensat	
	Experimental equipment (Roman pots, v	

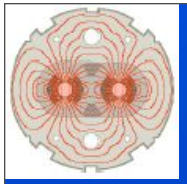
Accelerator Systems and Responsibilities 3

	System	Equipment Group	Beam Physics or Operational aspects
Beam based systems	Beam in the injectors		
	Ion beam in the injectors		
	Orbit feedback system		
	Filling efficiency and flat bottom conditions		
	Ramp and squeeze losses and overall quality		
	Machine protection system		
	Optics		
	Mechanical aperture		
	Machine Impedance and collective instabilities		
	Dynamic aperture		
	Lattice corrector settings		
	Triplet corrector settings		
	Lifetimes		
	Separation schemes		
	Crossing angle schemes		
	Collisions and luminosity steering		
	Experimental conditions		
	Ions		

No or very few names here

CERN AP interest known here

R,Bailey, LARP, April 2005



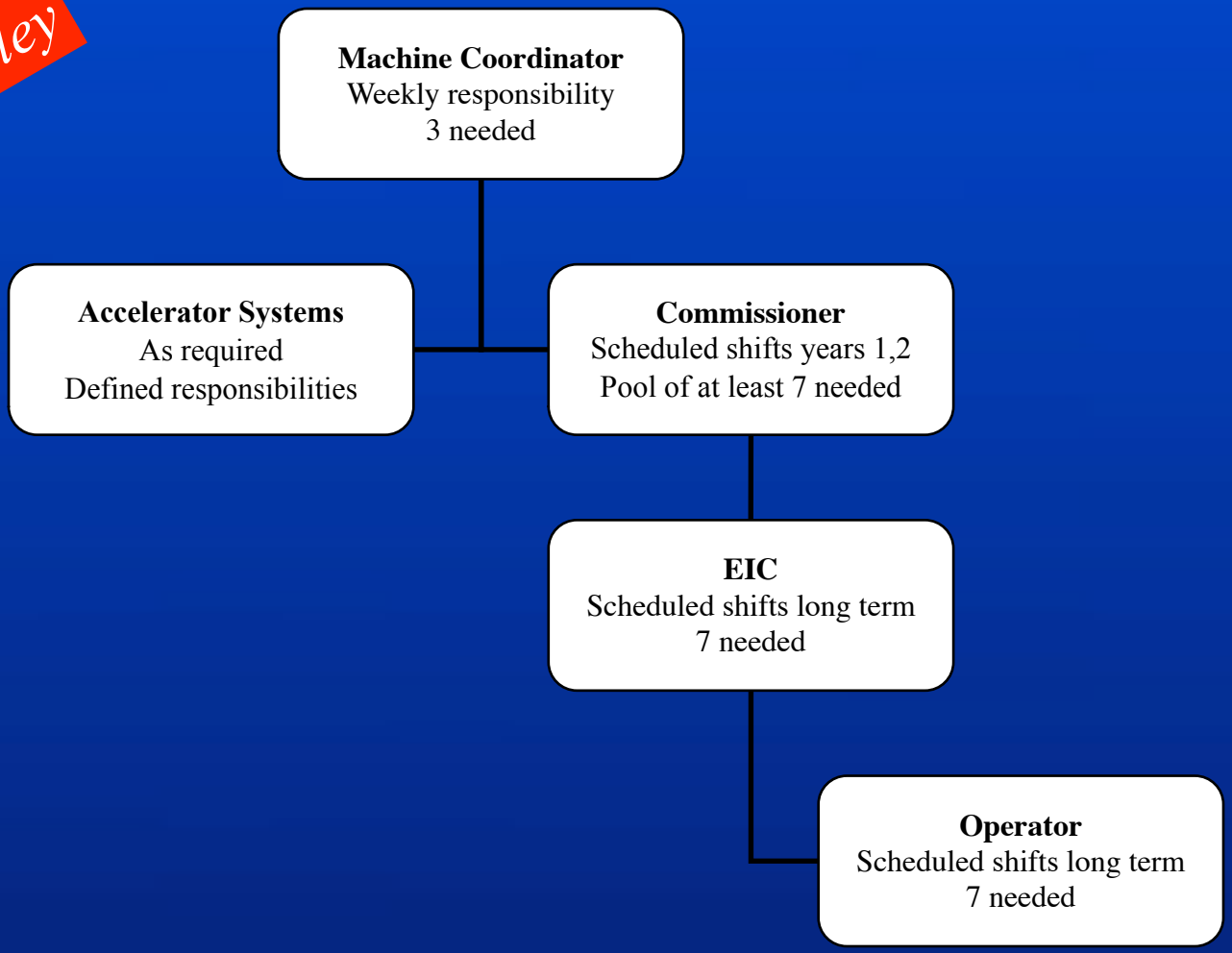
from Roger Bailey

Accelerator physics – O.Bruning			
Activity	**Responsible**	**Other CERN**	**LARP**
Optics	O.Bruning, S.Fartoukh M.Giovannozi, W.Herr T.Risselada Y.Papaphilippou		X
Aperture	B.Jeanneret, W.Herr F.Schmidt, F.Zimmermann Y.Papaphilippou		X
Impedence	F.Ruggiero E.Metral, F.Zimmermann		
Lattice correctors	S.Fartoukh, F.Schmidt Y.Papaphilippou		X
Triplet correctors	S.Fartoukh, F.Schmidt		X
Lifetimes	J.Jowett, F.Zimmermann		X
Separation / Crossing	W.Herr, F.Zimmermann Y.Papaphilippou		
Collisions	W.Herr, R.Assmann		
Luminosity	W.Herr, R.Assmann		X
Ions	J.Jowett, C.Carli S.Maury, S.Gilardoni H.Braun		

plus many other activities…

LTC Dec 14th 05 : LHC commissioning organisation

from Roger Bailey



LTC Dec 14th 05 : LHC commissioning organisation

from Roger Bailey

Machine Coordinator
Weekly responsibility
3 needed

Accelerator Systems
As required
Defined responsibilities

Commissioner
Scheduled shifts years 1,2
Pool of at least 7 needed

EIC
Scheduled shifts long term
7 needed

Operator
Scheduled shifts long term
7 needed

- M.Albert
- G.Crockford
- R.Giachino
- G.H.Hemelsoet
- D.Jacquet
- L.Normann
- F.Pirotte
- R.Suykerbuyk
- E.Veyrunes

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M.Gruwe	01.06
EIC3	07.06
EIC4	07.06
EIC5	01.07
EIC6	01.07
EIC7	01.07

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Accelerator system
Activity 1
Activity 2
Activity n

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EIC7	01.07

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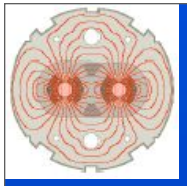
LTC Dec 14th 05 : LHC commissioning organisation



from Roger Bailey

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.Lamont
O.Bruning
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Weekly responsibility
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??

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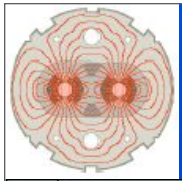
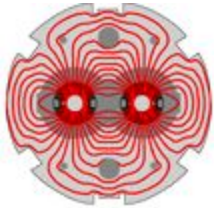


Tests with beam

from Roger Bailey

		Priority	Duration	Intensity	# shots	∂ Intensity	Cycle	Co
			h	p+		p+		
1	End TI8, Injection Steering, commission BDI, timing	1	24	5E+09	500	2.5E+12	de-Gauss	TDI in [illegible] LHCb
2	Trajectory acquisition commissioning, trajectory correction, threading, energy matching	1	24	5E+09	500	2.5E+12	de-Gauss	To IR7 beam dump
3	Linear Optics from kick/trajectory, coupling, BPM polarity checks, corrector polarity checks	1	12	1E+10	400	4.0E+12	de-Gauss	
4	Check BLM system	1	6	5E+09	100	5.0E+11	de-Gauss	First to TDI, then to IR7 dump
5	Aperture limits, acceptance	1	18	5E+09	1000	5.0E+12	de-Gauss	Oscillations, p bumps, BLMs, BCT
6	Momentum aperture	1	6	5E+09	100	5.0E+11	de-Gauss	Move energy of SPS beam
7	Commission multi-bunch injection ?	1	6	6E+10	50	3.0E+12	de-Gauss	BDI acquisition, MKI
8	Determination of quench level - calibrate BLMs	1	36	1E+11	20	2.0E+12	de-Gauss	Start with pilot and work slowly up
9	Commission normal cycle - recheck dispersion, optics, aperture	1	24	5E+09	300	1.5E+12	Nominal	Cycle & wait
10	Effects of magnetic cycle, variations during decay, reproducibility	1	24	1E+10	300	3.0E+12	Nominal	10 cycles
11	Energy offset versus time on FB	2	12	2E+10	100	2.0E+12	Nominal	Cycle & repeat
12	Field errors (high statistics)	2	12	2E+10	200	4.0E+12	Nominal	Collect data, off-line analysis
13	Transfer line collimation studies - TCDI	2	6	5E+09	800	4.0E+12	Nominal	TDI in - mainly on to TCDI
14	Injection protection studies - TDI	3	6	5E+09	800	4.0E+12	Nominal	On to TDI and IR7 dump
15	IR bumps, aperture, separation, crossing angle bumps [LHCb?]	3	6	5E+09	100	5.0E+11	Nominal	Careful in LHCb
	TOTAL		222		5270	2.9E+13		On to TED
	DAYS		9.3			6.5E+12		On to TDI
						4.0E+12		On to TCDI



LARP Beam Commissioning Status Report

BNL -FNAL - LBNL - SLAC

- Recent presence at CERN
- Commissioning Structure Review
- Sector Test Opportunities
- Expression of Interest Form
- Budget
  - Spending was less than originally planned,
  - so, v2c re-tune sent funds to instrumentation
  - spending on schedule for rest of FY, in particular with SPS and TI-8 events upcoming

Recent Presence at CERN

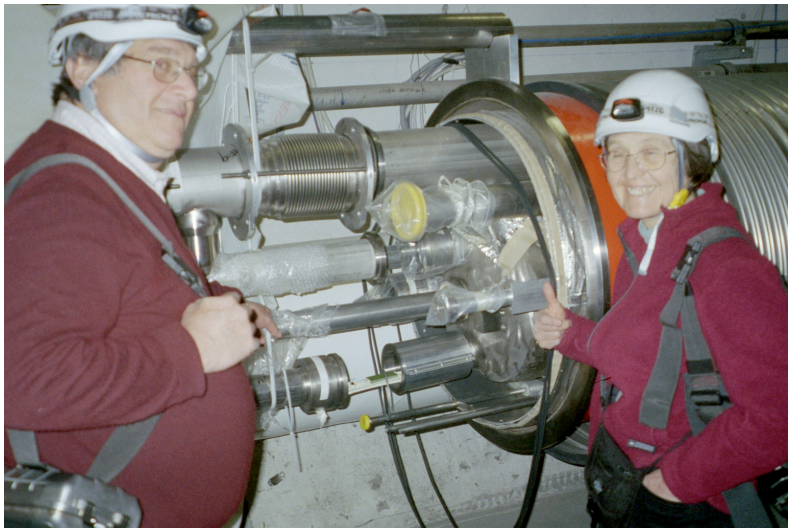
LARP

US LARP

BNL -FNAL - LBNL - SLAC

- **Several US visitors to CERN in January/February 06**
  - Nearly continuous presence for ~6 weeks
  - Chamonix workshop
    - Peggs, Syphers, Harms, (Shiltsev)
  - Software
    - Gysin, McCrory, Slaughter
    - Application development/ Schottky begun
  - Beam Commissioning logistics
    - Team Account set up
    - Access, Training, etc.
  - CCC opening
  - Get to know LHC beam principals
- **Reciprocal visits to FNAL in February**
  - Jacquet, Normann, Suykerbuyk

from Elvin Harms



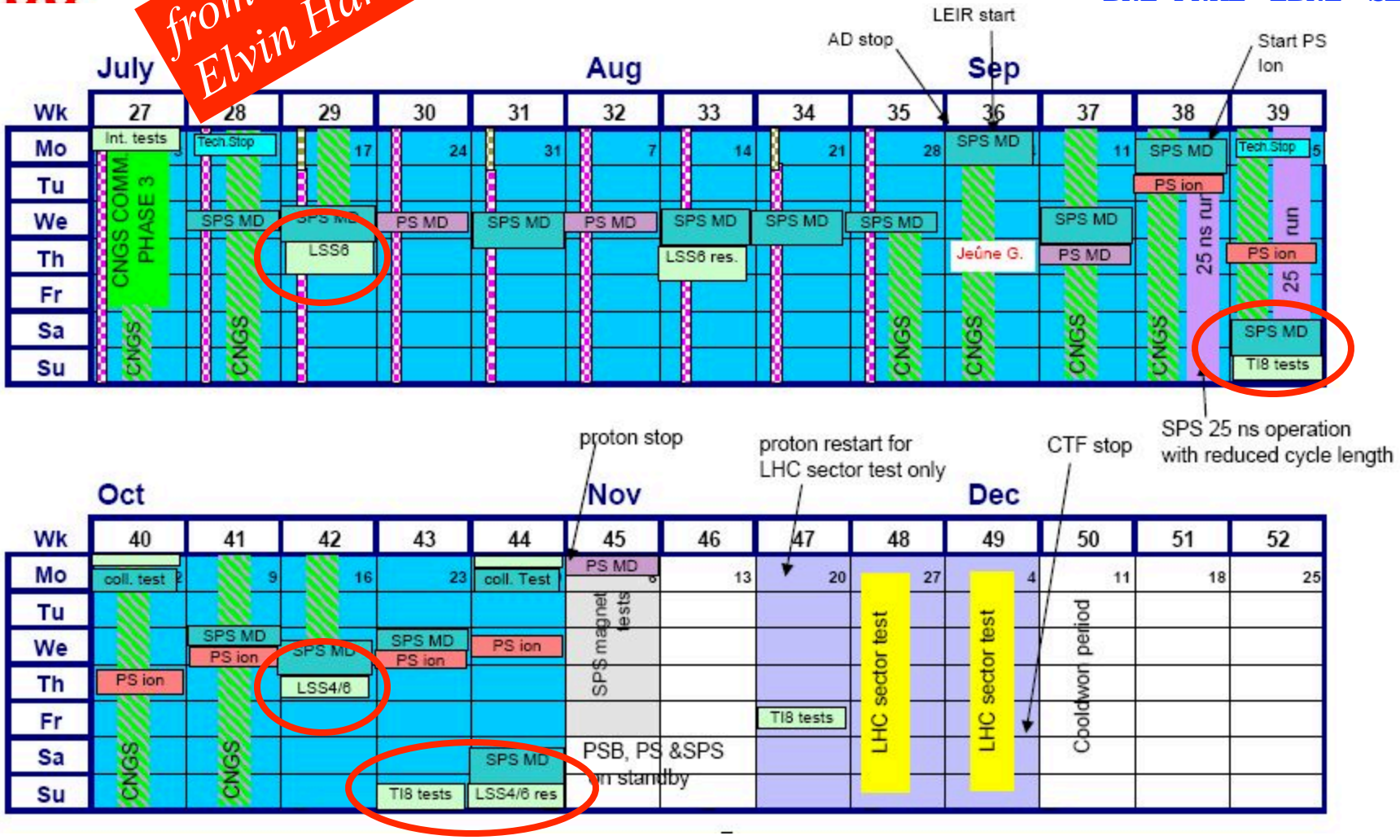
Upcoming Participation – SPS Schedule

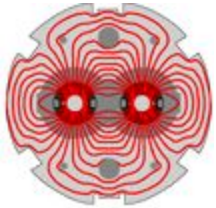
from Elvin Harms

LARP

US LARP

BNL -FNAL - LBNL - SLAC





Beam Commissioning: Expression of Interest

BNL -FNAL - LBNL - SLAC

- Beam Commissioning 'Expression of Interest' form available on-line
- Go to http://uslarp.org for the form (near the bottom of the web page)
  - Test marketed to Fermilab/LARP – 11 responses
  - Full roll-out this meeting
  - Please respond by 1 June 2006

note: not JUST for long-term CERN visits

from Elvin Harms, LARP Collaboration Meeting, Apr06

Commissioning Expression of Interest Form

Fermilab

LHC Accelerator Research Program (LARP)

LARP/LHC Beam Commissioning

Expression of Interest

AD Meetings
LARP Meetings
Document DB
USLARP Home
AD/LARP Home

The LHC Accelerator Research Project (LARP) is a multi-laboratory effort to foster US involvement in the Large Hadron Collider project at CERN. LARP is committed to being a presence for LHC Beam Commissioning scheduled to begin in 2007. At this time effort is underway to define interests and capabilities of US accelerator experts and link them into the Commissioning organization for the LHC. Beam Commissioning work may involve travel to CERN and/or remote effort from the US. This document serves only as an expression of interest. Receipt of same in no way guarantees nor commits one to a role in this effort.

Kindly complete and return the form below to aid us in formulating the US LHC commissioning team.

You can download this PDF document, or submit this electronic form.

Your Name	
Address	
Phone	
Email Address	
Affiliation	
Department/Organization	
Current Position/Duties	
Fraction of time available	
Availability to visit CERN (Length of stay, begin date)	
Past beam commissioning/Operational experience	
Areas of interest	
Unique abilities you can bring to this effort	

US LHC Accelerator Research Program
bnl - fnal- lbnl - slac

LARP

LARP/LHC Beam Commissioning
Expression of Interest

The LHC Accelerator Research Project (LARP) is a multi-laboratory effort to foster US involvement in the Large Hadron Collider project at CERN. LARP is committed to being a presence for LHC Beam Commissioning scheduled to begin in 2007. At this time effort is underway to define interests and capabilities of US accelerator experts and link them into the Commissioning organization for the LHC. Beam Commissioning work may involve travel to CERN and/or remote effort from the US.

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Kindly complete and return the form below to aid us in formulating the US LHC commissioning team

Name _____

Address _____

Phone _____

Email _____

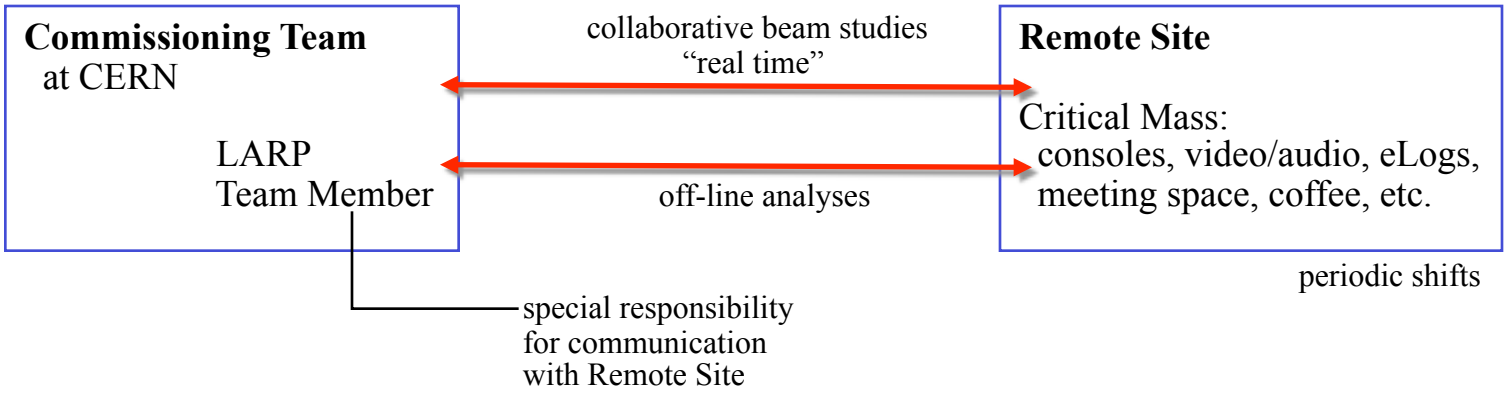
Affiliation _____

Department/Organization _____

Current Position/Duties

_____

Types of Participation



Four Types of Participation:

- Deliverables

  person builds something, visits to install, debug, etc., then leaves; may need remote access

- On-site Commissioning

  person has moved to CERN (for ~1 year, say) and works daily with LHC group

- 1-on-1 Contacts

  person works with a particular person or group located at CERN, with occasional trips to CERN to participate in a study, etc.

- Remote Participation

  person is part of a group at Remote Site, participating daily for shorter time periods

  "Training" can be performed at the Remote Site; periodic, shorter trips to CERN working with the "On-site" commissioners; people can continue to work remotely upon return

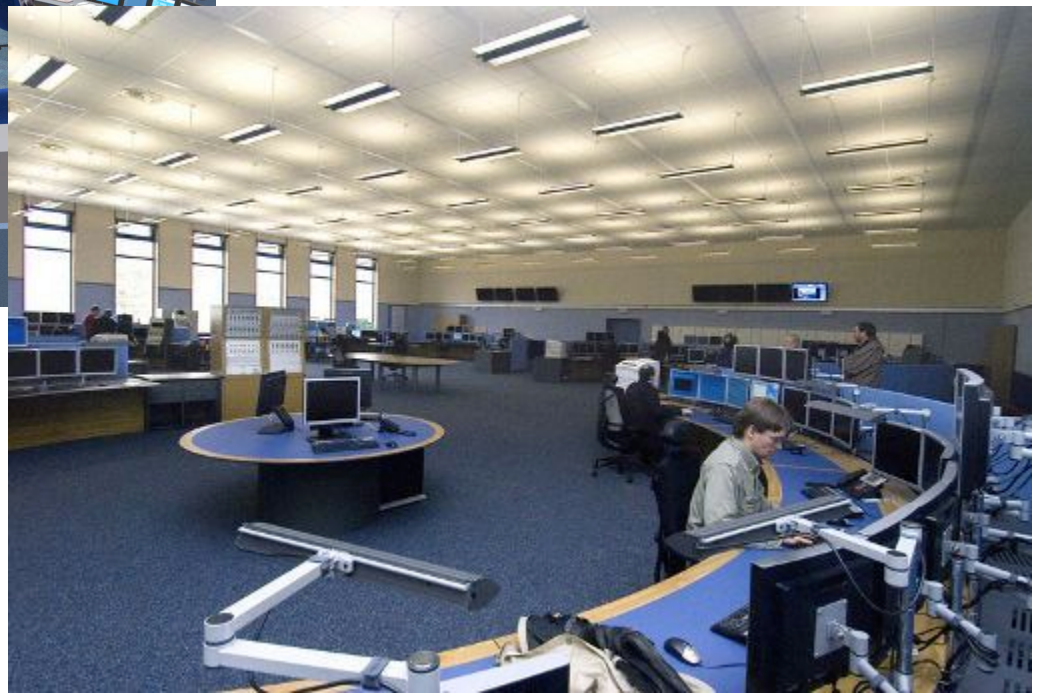
LHC@FNAL – LARP/LHC needs

LARP

US LARP

BNL -FNAL - LBNL - SLAC

from Elvin Harms



Model the CCC at CERN

- speed assimilation prior to stays at CERN
- ease in remote participation in studies
- 'service after the sale'

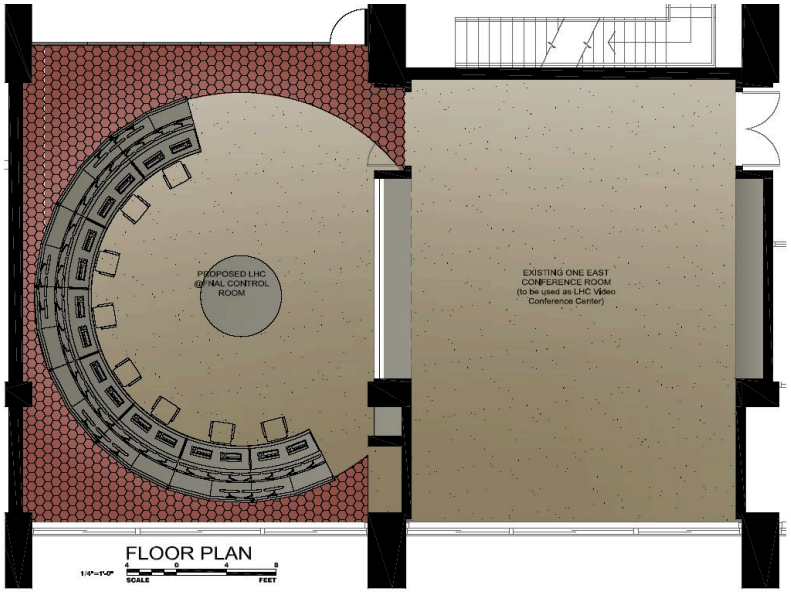
LHC@FNAL – renderings

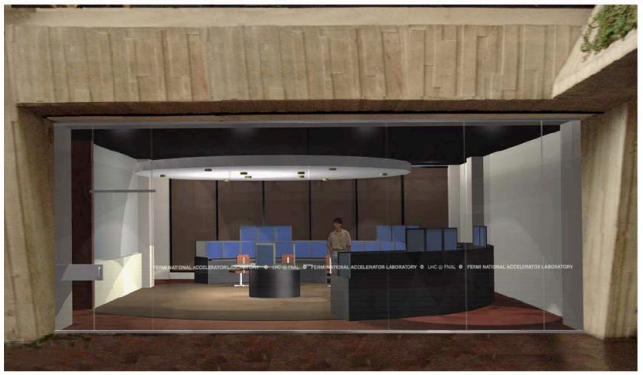
LARP

US LARP

BNL -FNAL - LBNL - SLAC

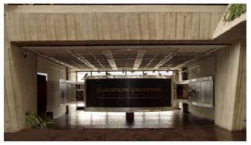
from Elvin Harms





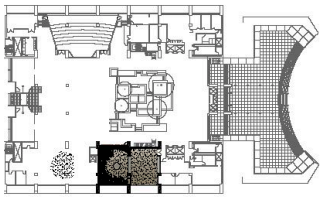
View of proposed control room – looking east from Atrium

View of existing conditions



View with projection on wall

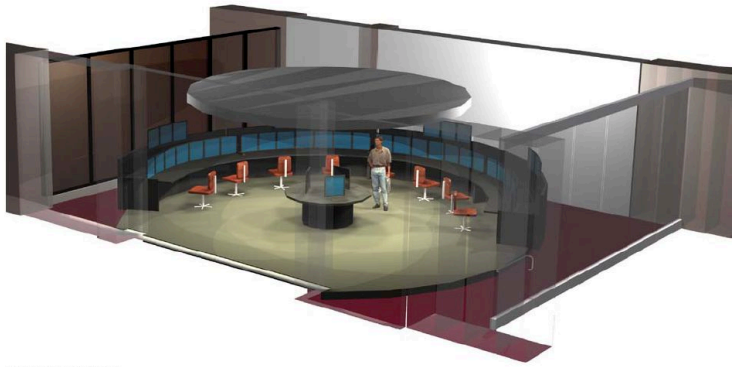
View with projection on glass



Atrium level key plan

LHC @ FNAL
OPERATIONS CENTER

ATRIUM LEVEL PROPOSAL
April 25, 2006
FESS / Engineering



Isometric view of proposed control room

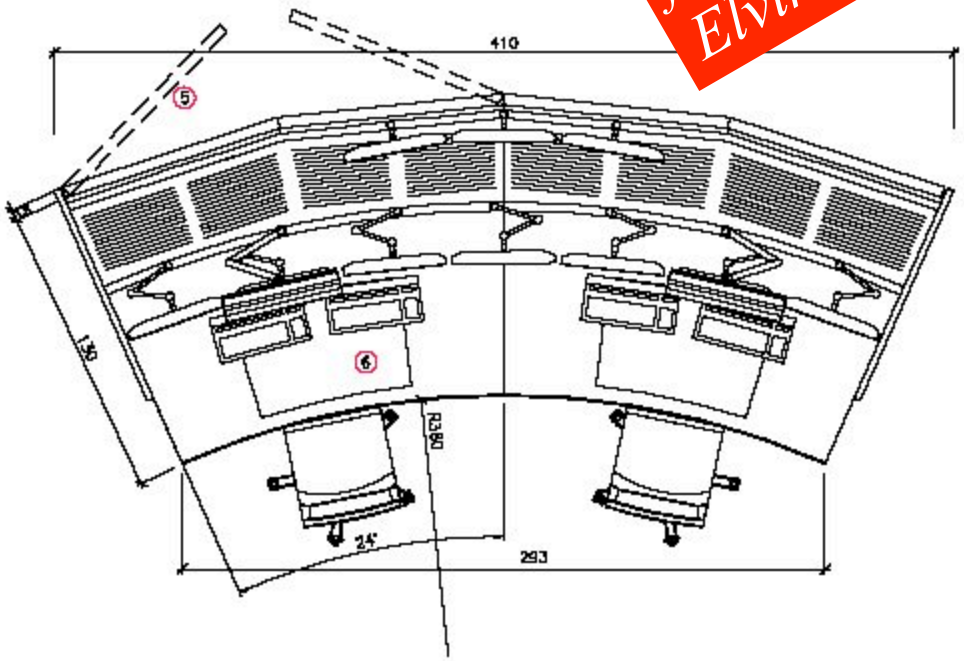
LHC@FNAL – Consoles

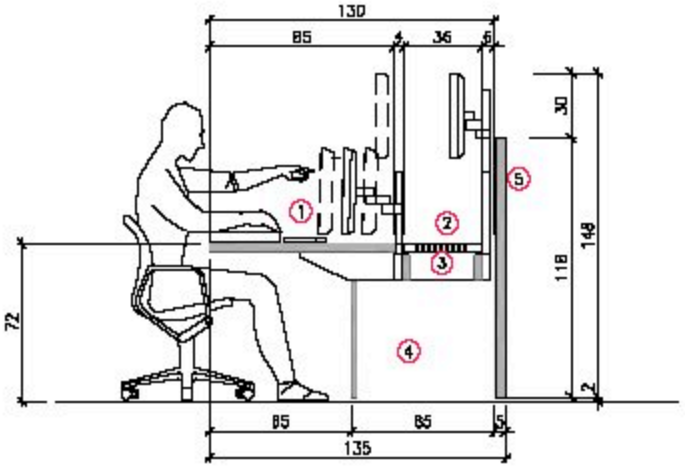
LARP

US LARP

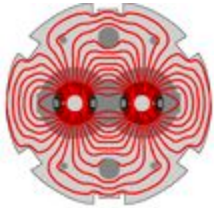
BNL -FNAL - LBNL - SLAC

from Elvin Harms





① Work top
② Monitor top
③ Cable channel
④ Installation room
⑤ Acoustic screen doors
⑥ Insert
⑦ Light–top



LARP

LHC@FNAL

BNL -FNAL - LBNL - SLAC

- Joint CMS and accelerator activity
  - for accelerator, LARP is main customer
- ~$600K provided by FNAL directorate
- Look and feel of CERN's CCC
- Schedule is to 'complete' this Fall
- Number One challenge is to get securely connected to the CERN networks
- While center is @ FNAL, is intended to be used by all LARP collaborators
  - need to further develop this aspect

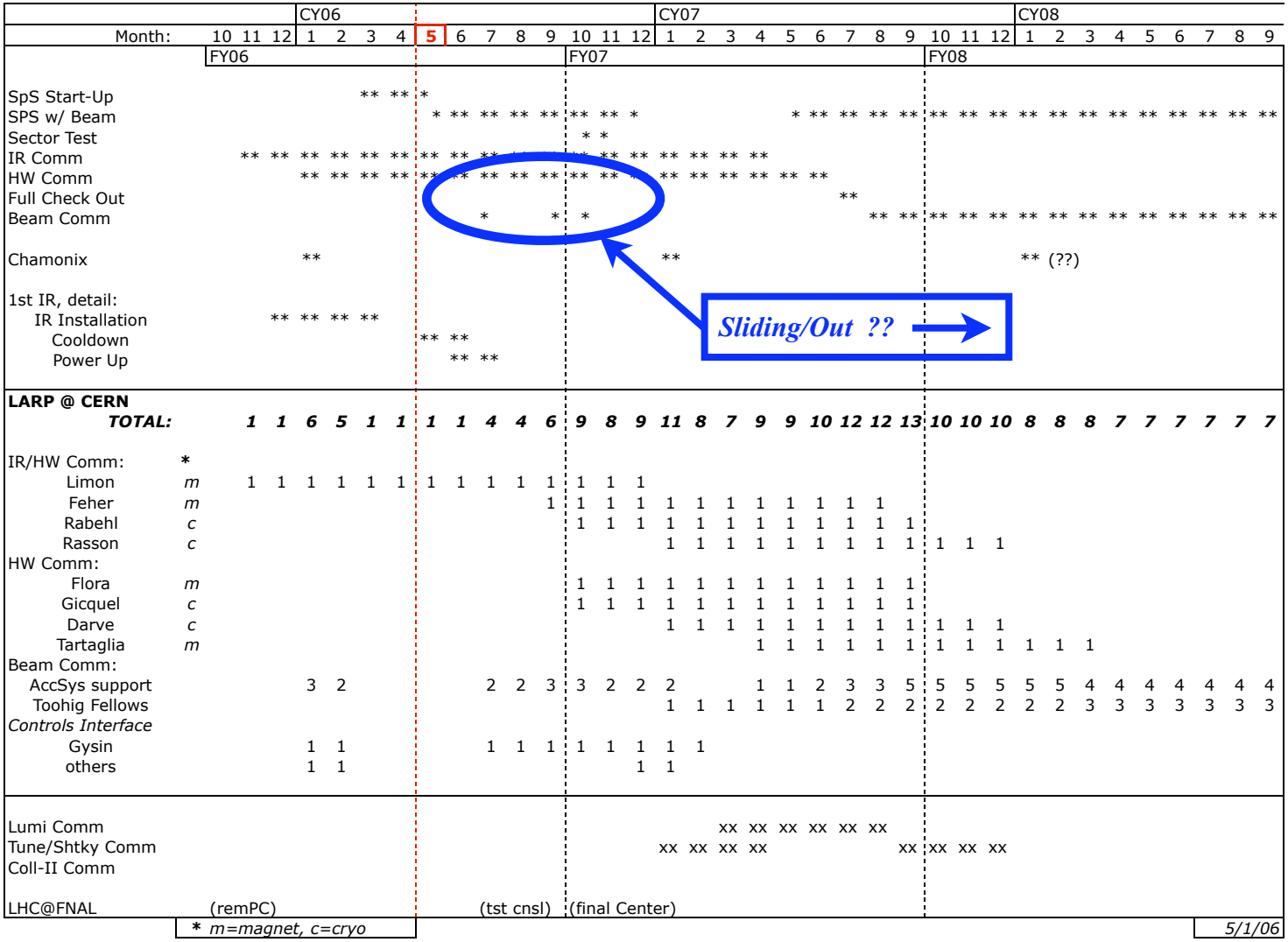
Commissioning Time Line

	CY06												CY07												CY08									
Month:	10	11	12	1	2	3	4	**5**	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9
	FY06												FY07												FY08									
SpS Start-Up						**	**	*																												
SPS w/ Beam								*	**	**	**	**	**	**	*								*	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Sector Test													*	*																						
IR Comm		**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**																
HW Comm				**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**																
Full Check Out																							**													
Beam Comm										*		*	*											**	**	**	**	**	**	**	**	**	**	**	**	**	**
Chamonix				**												**												** (??)								
1st IR, detail:																																				
IR Installation		**	**	**	**																															
Cooldown								**	**																											
Power Up									**	**																										
LARP @ CERN TOTAL:		***1***	***1***	***6***	***5***	***1***	***1***	***1***	***1***	***4***	***4***	***6***	***9***	***8***	***9***	***11***	***8***	***7***	***9***	***9***	***10***	***12***	***12***	***13***	***10***	***10***	***10***	***8***	***8***	***8***	***7***	***7***	***7***	***7***	***7***	***7***
IR/HW Comm: *																																				
Limon *m*	1	1	1	1	1	1	1	1	1	1	1	1	1	1																						
Feher *m*												1	1	1	1	1	1	1	1	1	1	1	1													
Rabehl *c*													1	1	1	1	1	1	1	1	1	1	1	1												
Rasson *c*																1	1	1	1	1	1	1	1	1	1	1	1									
HW Comm:																																				
Flora *m*													1	1	1	1	1	1	1	1	1	1	1	1												
Gicquel *c*													1	1	1	1	1	1	1	1	1	1	1	1												
Darve *c*																1	1	1	1	1	1	1	1	1	1	1	1									
Tartaglia *m*																			1	1	1	1	1	1	1	1	1	1	1	1						
Beam Comm:																																				
AccSys support				3	2					2	2	3	3	2	2	2			1	1	2	3	3	5	5	5	5	5	5	4	4	4	4	4	4	4
Toohig Fellows																1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3
Controls Interface																																				
Gysin				1	1					1	1	1	1	1	1	1	1																			
others				1	1										1	1																				
Lumi Comm																		xx	xx	xx	xx	xx	xx													
Tune/Shtky Comm																xx	xx	xx	xx					xx	xx	xx	xx									
Coll-II Comm																																				
LHC@FNAL	(remPC)									(tst cnsl)			(final Center)																							

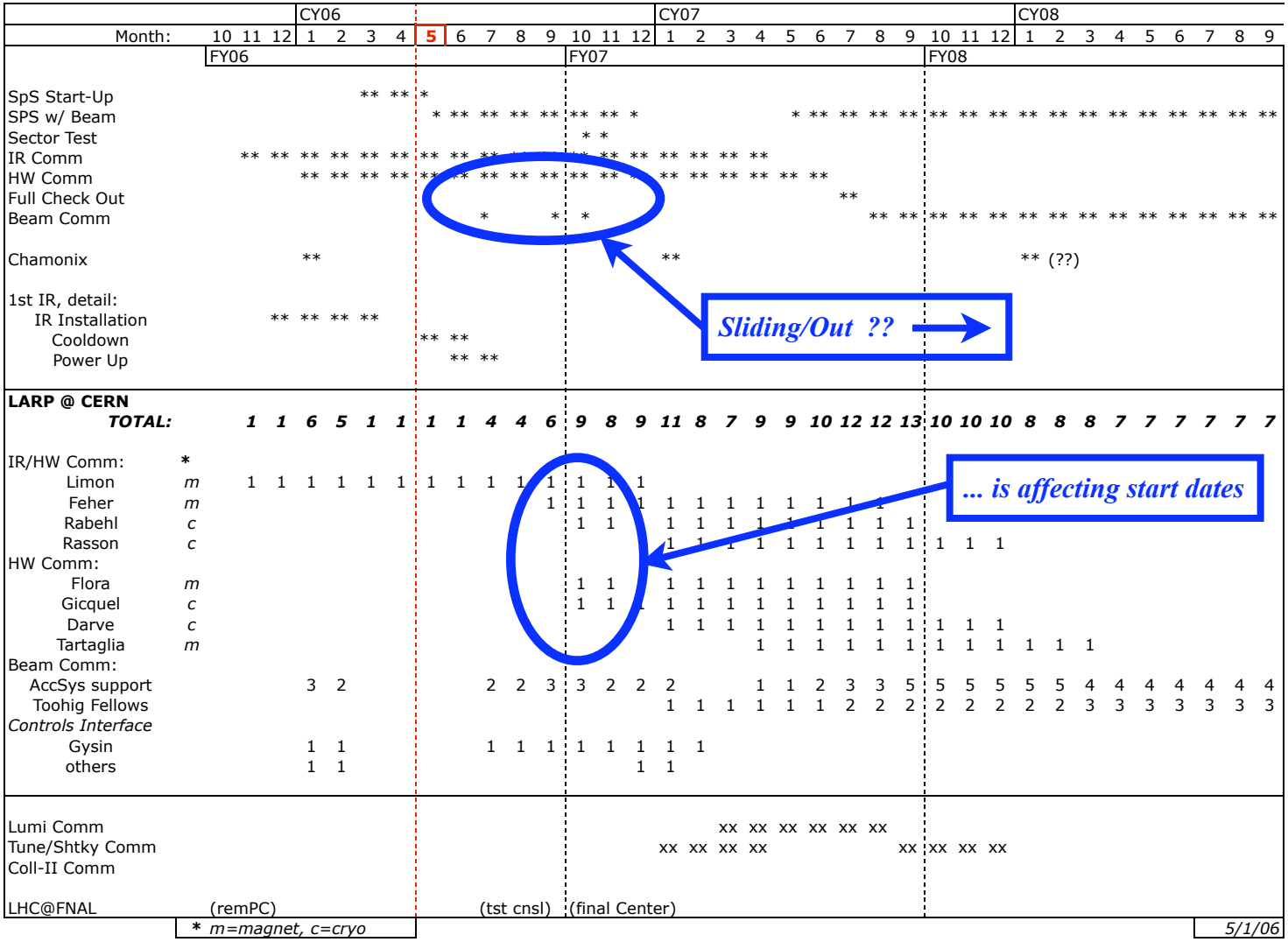
* *m=magnet, c=cryo*

5/1/06

Commissioning Time Line



Commissioning Time Line



Commissioning Budget -- FY06

- FY06 request was met...
  - Originally: IR -- 540K, Beam -- 400K --> 940K
- Funds re-distributed, re-negotiated:
  - Hardware Commissioning WBS formed (1.2.1.3)
  - Labs agreeing to support salaries, while LARP supports travel, relo, etc.
  - Start of long-term trips delayed; actual costs of shorter trips realized; some funds re-allocated toward instrumentation
  - Final 'tuned' budget = 879K; expected to be spent

LARP FY2006 budget v2c

Mar 31, 2006			Total	Labor+MTSC				Labor				MTSC			
WBS				BNL	FNAL	LBNL	SLAC	BNL	FNAL	LBNL	SLAC	BNL	FNAL	LBNL	SLAC
US LHC Accelerator Research Program			11000	3264	3300	4086	350	2240	2346	2539	240	1024	761	1186	90
1	**Accelerator Systems**	**Shiltsev**	**3684**	**875**	**1200**	**1309**	**300**	**607**	**927**	**962**	**240**	**268**	**273**	**347**	**60**
1.1	**Instrumentation**	**Ratti**	**1635**	**450**	**250**	**935**	**0**								
1.1.1	Phase I														
1.1.1.1	Tune feedback	Cameron	430	405	25			375	17			30	8		
1.1.1.2	Luminometer	Ratti	960	25		935		20		667		5		268	
1.1.1.4	Schottky monitor	Jansson	245	20	225			20	180			0	45		
1.2	**Commissioning**	**Syphers**	**879**	**65**	**670**	**144**	**0**								
1.2.1	Phase I														
1.2.1.1	Beam Commissioning	Harms	335	35	300			20	200			15	100		
1.2.1.2	Interaction Region Commissioning	Lamm	501	30	335	136		22	245	96		8	90	40	
1.2.1.3	Hardware Commissioning	Lamm	43		35	8			25				10	8	

Commissioning Summary

- IR Commissioning well underway; LARP personnel (2) showing up at CERN in next 6 mos., more to go later in year
- Hardware Commissioning (~1-yr-long visits) being supported *via* LARP; most details worked out, and continuing to develop
  - CERN offering Project Associate positions; LARP to handle travel, relo, ...
  - P. Limon at CERN for 1 yr, partially funded by LARP
- Task Lists developed, names appearing; negotiations of time, effort on-going
  - FNAL: +4-7 'approved'; +2-3 from LBNL for HW Comm.
  - delicate negotiating process, as involves bosses, families, bureaucracy, ...
- Commissioning Oversight Team formed of lab points-of-contact
  - Members to assist in technicalities of getting personnel to CERN
  - Fermilab developing 'guidelines' for travel/relo (in conj. w/ CMS); assume will 'translate' to other labs -- LBNL is present 'test bed'
- Commissioning L2 separated from AccPhys L2
  - Better concentration of effort, oversight
- First Toohig Fellow named; working on second...